Integrated Energy Efficiency

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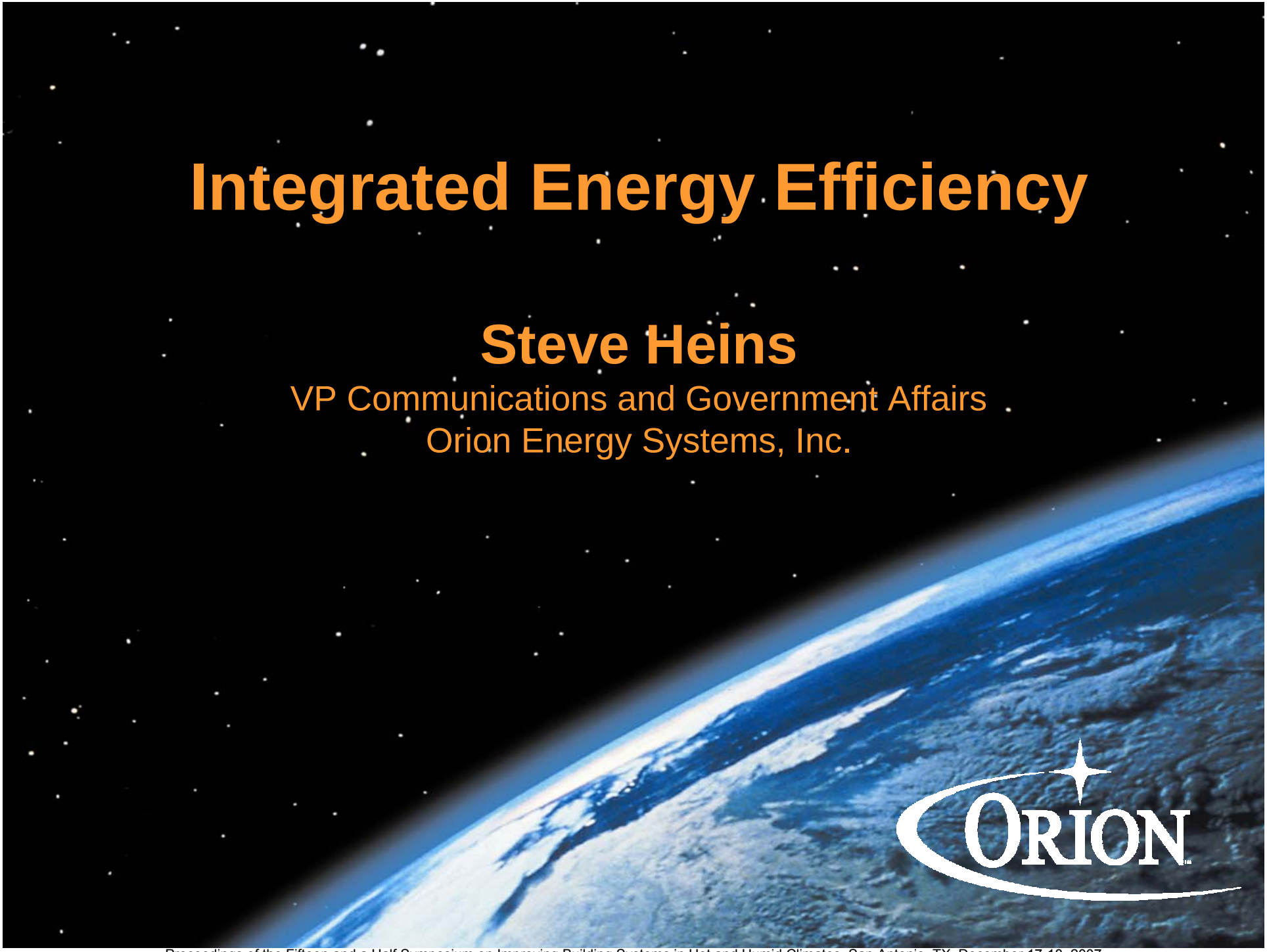
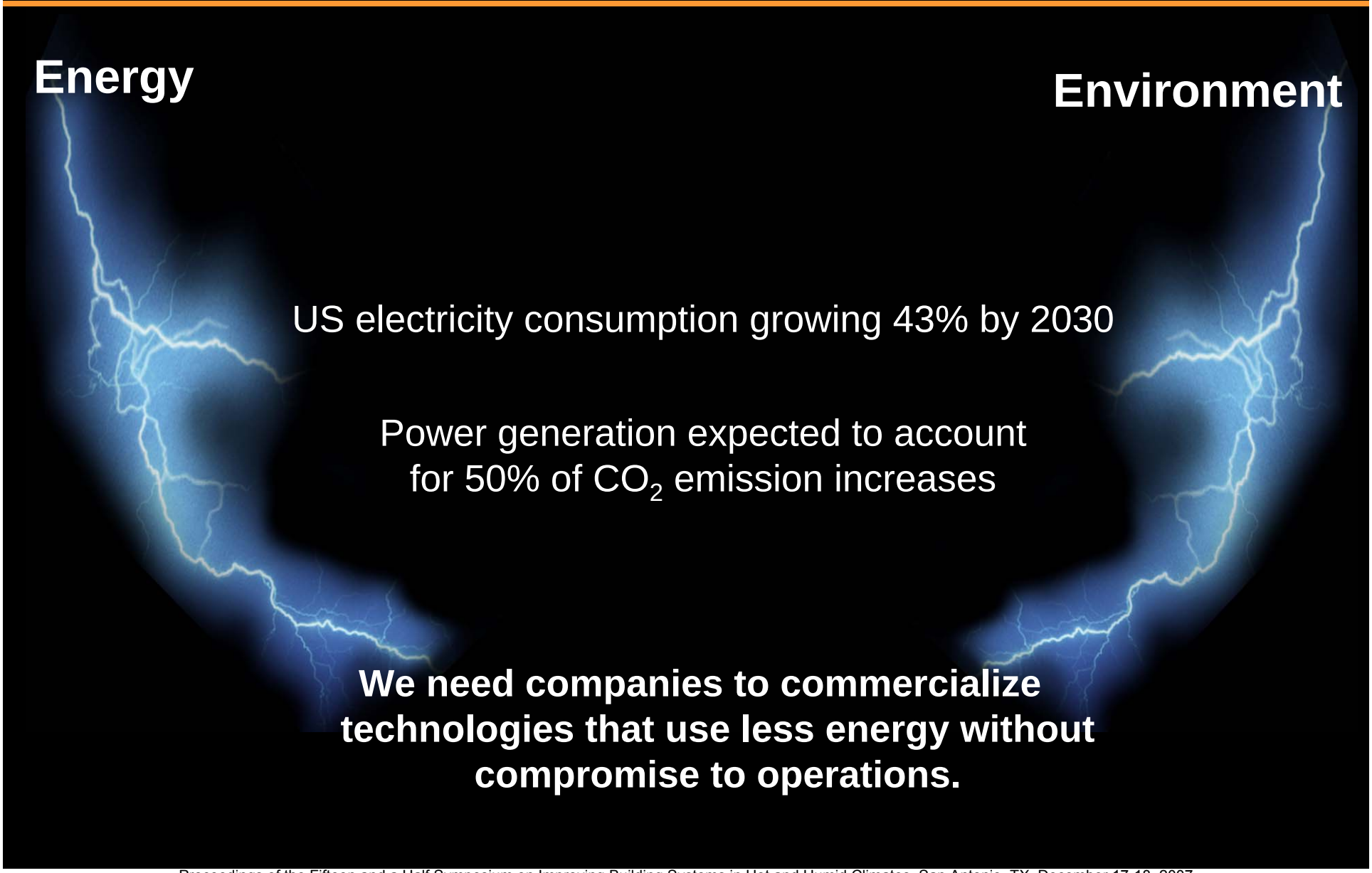


MegaTrend Convergence

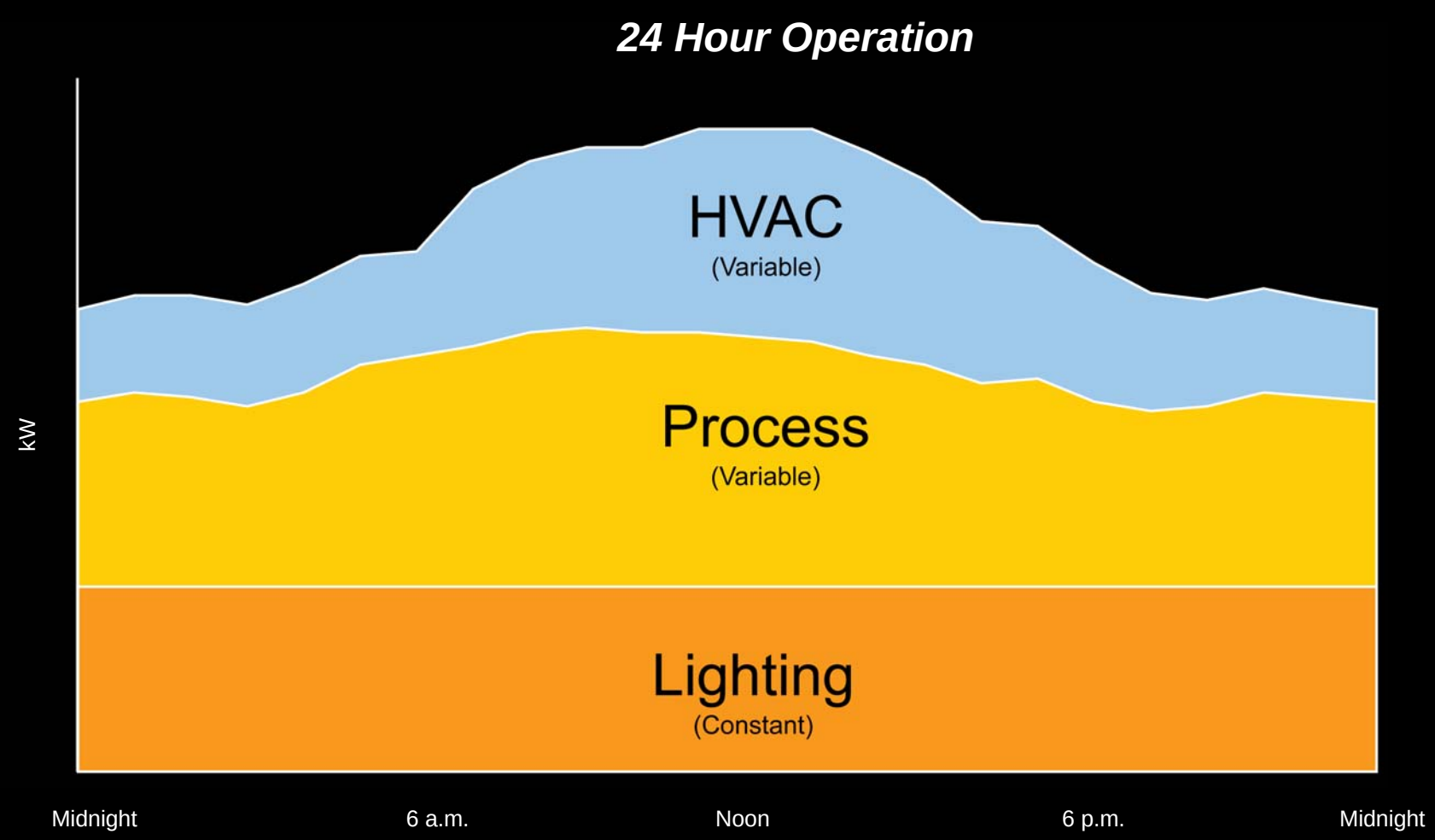


US electricity consumption growing 43% by 2030

Power generation expected to account for 50% of CO_2 emission increases

We need companies to commercialize technologies that use less energy without compromise to operations.

How Electricity Is Used



The Role of Lighting

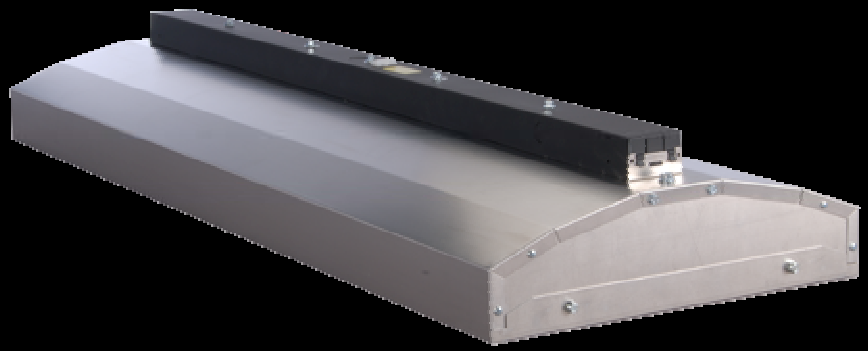
Lighting is a Major Component of Electricity Use

- Lighting accounts for 22% of electricity in the US
- C&I lighting accounts for 65% of that amount
- $42B spent on electricity for lighting by C&I sectors in 2005

High Intensity Discharge (HID) Fixtures

- Over 455,000 buildings using HID lighting in the US
- Developed in the 1960's
- Convert only 36% of electricity consumed to visible light

Phase I – Base and Peak Load Reduction



50% Less Energy Consumption

50% More Light

Improved Light Quality

Lower Maintenance Costs

Customer Story

Bemis Manufacturing
Sheboygan Falls, WI

Before

After

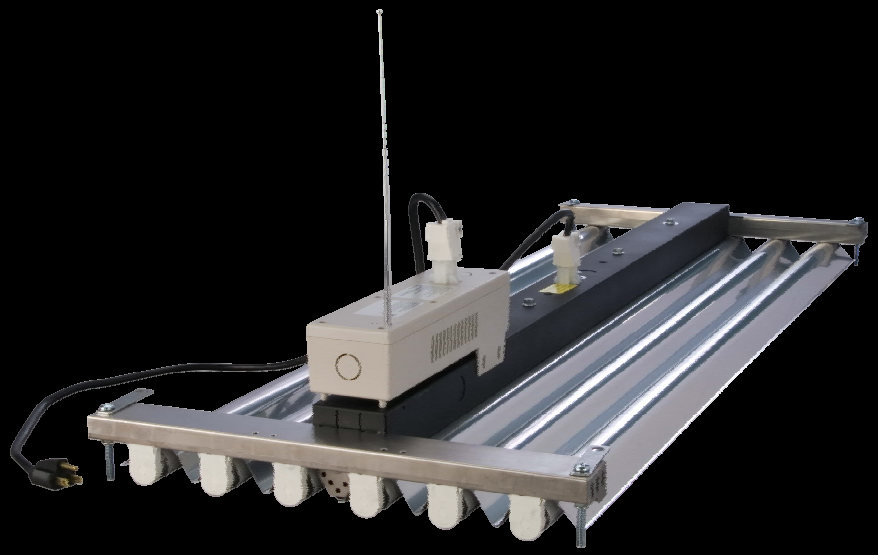
Energy & Financial Impacts

Annual Energy Savings	$317,897
Maintenance Savings	$63,579
Payback Period	Less than 2 years
Annual Displaced Energy	6,300,289 kWh
Displaced Capacity	731 kW

Annual Environmental Equivalents

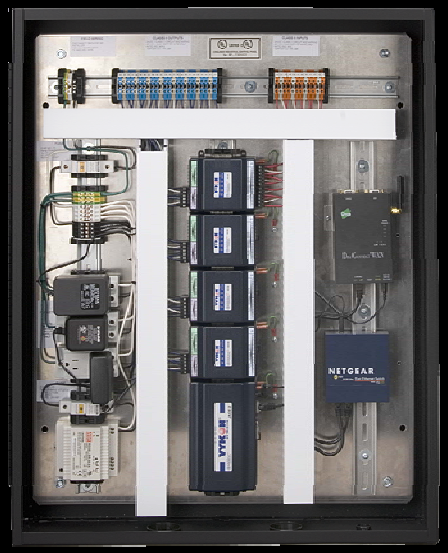
CO2 Reduction	6,147 tons
SO2 Reduction	26.7 tons
NOx Reduction	12.9 tons
Mercury Reduction	105.7 grams

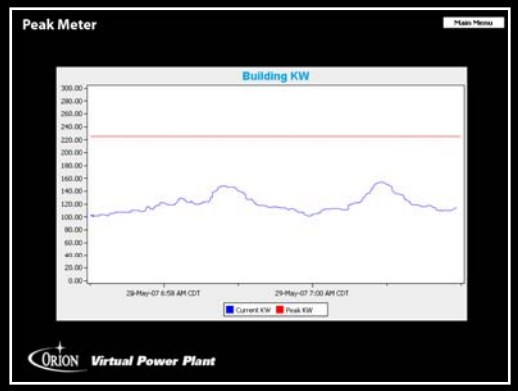
Phase II – Wireless Control



- **Motion Control**
- **Ambient Light Control**
- **Time of Day Control**
- **Demand Control**

Phase II – Energy Management System





Internet Enabled

Demand Meter Integration

Measurement and Verification

Automated Set-points

Phase III – Direct Renewable

- **Daylight Harvesting**
- **Minimal Conversion Loss**
- **Delivers When Grid is in Need**
- **Cost Competitive to Grid**

Off The Grid



Base and Peak Energy Reduction

Sensor Integration

Natural Daylight

Lowest Cost Renewable

Integrated Lighting

$1.0 million/MW

Solar

$6 – 9 million/MW

Wind

$1.3 - 1.9 million/MW

Biomass

$1.5 – 2.5 million/MW

Geothermal

$1.6 million/MW

Integrated Lighting system

Base Load Energy Reduction

Peak Load Energy Reduction

No Compromise

Stand Alone Value Proposition